



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷: B41M 3/00, B42D 5/00	A1	(11) International Publication Number: WO 00/16982 (43) International Publication Date: 30 March 2000 (30.03.00)
(21) International Application Number: PCT/FI99/00775 (22) International Filing Date: 21 September 1999 (21.09.99) (30) Priority Data: 982021 21 September 1998 (21.09.98) FI (71)(72) Applicants and Inventors: NYBERG, Timo, Richard [FI/FI]; Koivuviita 12 B 6, FIN-02130 Espoo (FI). ESKOLIN, Jan, Peter, Erik [FI/FI]; Atomikatu 1 D 30, FIN-33720 Tampere (FI). SARU, Sami, Ensio [FI/FI]; Vaajakatu 5 K 202, FIN-33720 Tampere (FI). (74) Agent: FORSSÉN & SALOMAA OY; Yrjönkatu 30, FIN-00100 Helsinki (FI).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>
(54) Title: CODING OF A SHEET-LIKE OR WEB-LIKE MATERIAL TO BE PROCESSED FURTHER (57) Abstract <p>Coding of a sheet-like or web-like material to be processed further, whereat an invisible identification code concerning the material is applied to at least one edge of the sheet-like or web-like material. The code may include data essential in view of further processing of the sheet-like or web-like material. In porous materials, the marker agent forms a volume at the edge of the material. In dense materials, the code in accordance with the invention consists of dots of marker agents on the face of the edge of the material to be coded. The marking in accordance with the invention can take place when the sheet-like material is in a bundle or being stacked into a bundle so that a number of sheets are marked in one operation in the direction of the edge of the bundle of sheets. The marking of a web-like material can take place when the web-like material is in a roll or being wound into a roll, in which case an invisible identification code is applied to at least one of the edges of the material.</p> <div data-bbox="852 1165 1388 1522" style="text-align: right;"> </div>		

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Coding of a sheet-like or web-like material to be processed further

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The present invention concerns a method for coding of sheet-like or web-like materials, such as paper, board, plastic films, or equivalent, in which method at least one edge of the material is provided with an identification code concerning said material, which code includes information essential from the point of view of further processing of the sheet-like material, such as, for example, sheet material, colour, gloss, smoothness, thickness, brightness, opacity, etc.

In the present invention, an edge of the material is understood as an area in the vicinity of an edge 2 of the sheet-like or web-like material 1, which area is illustrated in Fig. 1.

Many different sheet-like materials possess different properties, which affect their usability in further processing of said materials. If the apparatuses for further processing of sheet-like materials could regulate the parameters that affect the final result of the processing in compliance with the material to be processed, the final result of processing would be substantially equal irrespective of the nature of the material to be processed. For example, when a colour picture is produced on a paper sheet, the colour of the paper has a decisive effect on the appearance of the picture produced as a result of the further processing. Likewise, the porosity of the paper has an effect in affecting the spreading of the colour on the paper.

Thus, by means of data concerning the properties of a sheet and provided on the sheet-like material itself and by means of utilization of said data, it would be possible, considerably better than by now, to optimize the further processing and to regulate the parameters that affect the final result in the processing device itself.

In the patent application *FI 980756*, a method is described for marking of a sheet with identification and property data. The method in accordance with said invention differs from that described in the present patent application in the respect that the marking can be applied either to sheet-like material or to web-like material, and the code mark is always applied to an edge of the material.

The object of the other prior-art sheet marking methods currently in use has been to provide the sheet with a code or mark which includes information on the pattern or data or on the contents of the data contained on the sheet. Such modes of coding are employed, for example, in phone books and in other catalogues in order to differentiate the pages in compliance with their contents.

Further, there are methods for application of codes to an edge of a sheet, and the object of these codes is to code a pile of sheets so that the sequence in the pile or the presence of all sheets can be secured. Such a coding method is employed, for example, in account books, in which, by means of marking of the edges of pages, removal of pages from the account book is prevented.

The object of the present invention is to provide a method for coding of a sheet-like or web-like material, in which method a code that includes data concerning the material to be coded consists of a marker agent applied to an edge of the material to be coded and onto the face of the edge. Depending on the material, the code mark in accordance with the invention is provided in the material at its edge and on the face of the material in direct vicinity of the edge. Extension of the mark in the paper and on the paper face in the direction away from the edge depends on the porosity of the material to be marked. In the present invention, it has been realized that, when data essential from the point of view of further processing are marked to an edge of the sheet-like or web-like material, these data can be utilized automatically in the further processing while the code does, however, not hamper a normal process of further processing or a normal use of the sheet-like or web-like material.

In Fig. 2, it is shown how, in porous materials, a code in accordance with the invention is composed of dots 3 of marker agent, which dots form a volume 4 in the material to be marked. In dense materials, a code in accordance with the invention is composed of a group 3 of marker agent on the face of the material to be marked in the way shown in Fig. 3. Since, when a sheet-like or web-like material is coded in the way in accordance with the invention, the marker agent moves on the face of the material in the direction away from the edge of the sheet, a code mark in accordance with the invention can be read and identified also from other directions, besides directly in the direction from the side of the sheet-like or web-like material.

The marking of a sheet-like material in accordance with the invention can take place, for example, when the material is in a bundle or being stacked into a bundle so that a number of sheets are marked in one operation from the direction of the edge of the bundle of sheets. The marking of a web-like material can take place when the material is present in a roll or when it is being wound into a roll.

In an exemplifying embodiment of the invention shown in Fig. 4, a bundle 5 of sheets is marked in bundles of 500 sheets (ream) at a time by making use of colour nozzles 7 fitted side by side. When the bundle of sheets moves in a packaging machine 8 upwards in the stage of raising of the bundle, in accordance with the invention, a device fitted at the side of the raising path marks the side of the moving bundle with a code 6 which can be utilized in further processing.

When the method of coding in accordance with the invention is used, it is an advantage that the code is placed outside the area essential from the point of view of the further processing, as a result of which the marking code that is used does not affect the conduct of the materials that are used in the further processing on and in the material during the further processing.

It is a further advantage of the invention that, since the marking is applied to an edge of the sheet, the code area and, thus, the volume to be marked are very small,

in which case the consumption of marker agent is very low, which makes the marking economical.

5 Further, application of a code in accordance with the invention is simple, for example, by means of roll or spray solutions. Thus, application of the method in accordance with the present invention does not require major technical modifications in existing devices for treatment of sheets and rolls, in which case the method can be introduced readily also in existing systems.

10 By means of a code applied by means of the method in accordance with the present invention, in which the code mark is applied asymmetrically in different locations at the edge of a bundle of sheets, in further processing, based on the location of the mark, it is possible to establish the side and the precise position of an individual sheet.

15 The invention is not restricted to the preferred exemplifying embodiments of the invention described above, but many variations are possible within the scope of the inventive idea defined in the following patent claims.

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Claims:

1. A method for coding of a sheet-like or web-like material to be processed further, **characterized** in that a code that includes data that can be utilized, among other things, in further processing of the sheet-like or web-like material to be processed further is present at an edge of the material to be coded.
2. A method as claimed in claim 1, **characterized** in that, when the material to be coded is porous, the code forms a volume in the material to be coded.
3. A method as claimed in claims 1 and 2, **characterized** in that the marker agent used in coding is capable of being absorbed into the material to be coded.
4. A method as claimed in claim 1, **characterized** in that, when the material to be coded is dense, the code consists of a group of marker agent on the face of the material to be coded.
5. A method as claimed in any of the claims 1 to 4, **characterized** in that the marking takes place when the sheet-like material is in a bundle or being stacked into a bundle so that the marking is applied in one operation to a number of sheets to at least one of the edges of the bundle of sheets.
6. A method as claimed in any of the claims 1 to 4, **characterized** in that the marking takes place when the web-like material is present in a roll or being wound into a roll so that the marking is applied in one operation to at least one of the edges of the web-like material.
7. A method as claimed in any of the claims 1 to 6, **characterized** in that the marker agent that is used is substantially invisible to the human eye.
8. A method as claimed in any of the claims 1 to 6, **characterized** in that the marker agent that is used is fluorescent.

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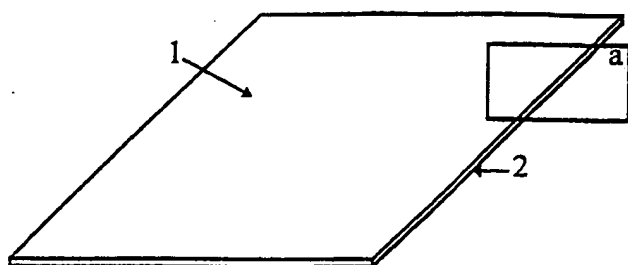


FIG. 1

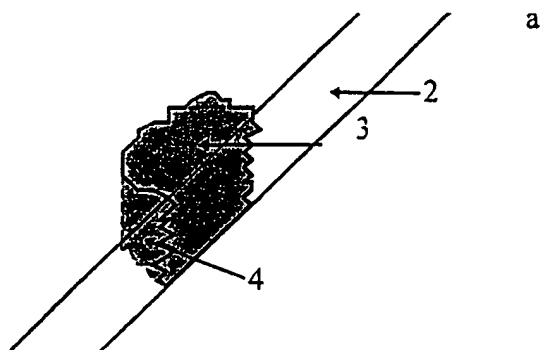


FIG. 2

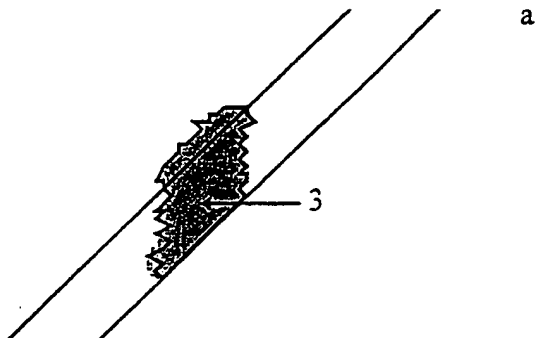


FIG. 3

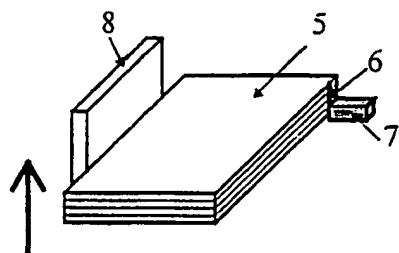


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 99/00775

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B41M 3/00, B42D 5/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B41M, B42D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5717976 A (A. CHOWDRY ET AL), 19 February 1998 (19.02.98), page 1, line 44 - page 2, line 12, figure 2	1-4,7
Y	--	5,6,8
Y	FR 2651179 A (JOEL SICOT) 1991-03-01 (abstract) World Patents Index (online). London, U.K.: Derwent Publications, Ltd (retrieved on 2000-01-03). Retrieved from EPO EPODOC Database; & FR 2651179 A (SICOT J) 1991-03-10 (abstract) (online) (retrieved on 2000-01-03). Retrieved from EPO WPI Database. DW199119, Accession No. 1991-135104 & FR 2651179 A1 (SICOT J.) 1 March 1991, abstract, figure 1	5,6
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☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

4 January 2000

Date of mailing of the international search report

05-01-2000

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Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5093147 A (P.G. ANDRUS ET AL), 3 March 1992 (03.03.92), abstract -----	8

INTERNATIONAL SEARCH REPORT
Information on patent family members

02/12/99

International application No.

PCT/FI 99/00775

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5717976 A	19/02/98	NONE	
US 5093147 A	03/03/92	CA 2091163 A	13/03/92
		EP 0548260 A	30/06/93
		JP 6500590 T	20/01/94
		WO 9204192 A	19/03/92

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